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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/726,606  | 12/04/2003  | Masato Koyama        | 246244US2SRD        | 6989             |
| 22850   | 7590        | 03/14/2005           | EXAMINER            |                  |
| OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.<br>1940 DUKE STREET<br>ALEXANDRIA, VA 22314 |             |                      | VU, HUNG K          |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |
|   |             |                      | 2811                |                  |

DATE MAILED: 03/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                     |                  |
|------------------------------|---------------------|------------------|
| <b>Office Action Summary</b> | Application No.     | Applicant(s)     |
|                              | 10/726,606          | KOYAMA ET AL.    |
|                              | Examiner<br>Hung Vu | Art Unit<br>2811 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 14 December 2004.  
 2a) This action is FINAL.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-22 is/are pending in the application.  
 4a) Of the above claim(s) 1-6 and 11-22 is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 7 and 10 is/are rejected.  
 7) Claim(s) 8 and 9 is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>3/2/04</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election with traverse of Invention of Embodiment I of Figure 1, Claims 7-10, in the reply filed on 12/14/04 is acknowledged. The traversal is on the ground(s) that the search and examination of the entire application would not place a serious burden on the Examiner. This is not found persuasive because it is well settled that related inventions are restrictable if it is shown that these inventions distinct. It was clearly established that these inventions are in fact distinct.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 1-6 and 11-22 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected Invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 12/14/04.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 7 and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Hwang et al. (PN 6,797,645).

Hwang et al. discloses, as shown in Figures 1-3b, a method of manufacturing a semiconductor device, comprising:

forming a metal oxide film on a substrate;

applying a heat treatment to the metal oxide film under temperature falling within a ranged of between 700°C and 900°C;

adding nitrogen to the metal oxide film after the heat treatment by using nitrogen under an excited state so as to obtain a gate insulating film consisting of a metal oxynitride film containing a metal-oxygen-nitrogen bond chain [see Col. 1, line 66 – Col. 3, line 12. Note that Hwang et al. discloses the same method of forming the gate insulating film, therefore, it is inherent that the metal-oxygen-nitrogen having the bond chain];

forming a gate electrode on the gate insulating film [note that Hwang et al. discloses the method of forming the MOSFET, it is inherent that a gate electrode will be formed after forming the gate insulating film].

With regard to claim 10, Hwang et al. discloses the metal contained in the gate insulating film includes at least one element selected from the group consisting of Zr, Hf, Ti and a lanthanide metal.

*Allowable Subject Matter*

4. Claims 8 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The following is an examiner's statement of reasons for allowance:

Applicant's claims 8 and 9 are allowable over the references of record because none of these references disclose or can be combined to yield the claimed method comprising the step of applying a heat treatment to the gate insulating film under an oxygen partial pressure of  $1 \times 10^{-3}$  Torr or less, before forming the gate electrode, as recited in claim 8, forming the gate electrode continuously carried out under vacuum after deposition of the gate insulating film without exposig the gate electrode to the air atmosphere, as recited in claim 9.

*Conclusion*

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (571) 272-1666. The examiner can normally be reached on Mon-Thurs 6:00-3:30, alternate Friday 7:00-3:30, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (571) 272-1732. The Central Fax Number for the organization where this application or proceeding is assigned is (703) 872-9306.

Art Unit: 2811

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

March 4, 2005

Hung Vu

Hung Vu

Primary Examiner